MINISTRY OF EDUCATION AND HIGHER EDUCATION

FORM FOUR EXAMS, 2017

PHYSICS

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P/LAND NATIONAL EXAMINATION BOARD

MINISTRY OF EDUCATION AND HIGHER EDUCATION
PUNTLAND NATIONAL EXAMINATIONS BOARD

Code Number [ ]

FORM FOUR EXAMINATION 2017
Time: 2 hours AND 10 minutes for reading

PHYSICS
Instructions to candidates

- Answer all the questions
- This paper consists of 15 pages, count it and if any is missing inform your invigilator
- Do not write your **name and roll number** on the exam paper
- Make sure that **student's profile** is attached to the exam paper, if not, inform you invigilator.
- No extra paper is allowed. Rough work can be done on page 1. This will not be marked.
- If you make a mistake, **cross out the incorrect** answer and **write your correct answer.**

This exam paper consists of following parts

PART ONE:	MULTIPLE CHOICE QUESTIONS	10 MARKS
PART TWO:	STRUCTURED QUESTIONS	90 MARKS

TOTAL   100 marks

For the marker only

Parts	Marks
Part one	
Part two	
Total	%

Use this page for rough work, it will not be marked.

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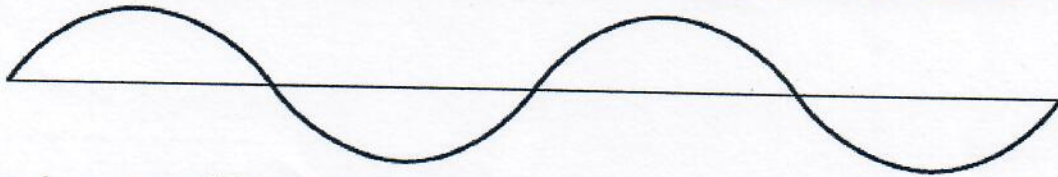## PART ONE: MULTIPLE CHOICE QUESTIONS

Circle the correct answer   **[10MARKS]**

1- Which of the following is basic physical quantity?
   a) Force   c) Time

   b) Energy   d) Speed

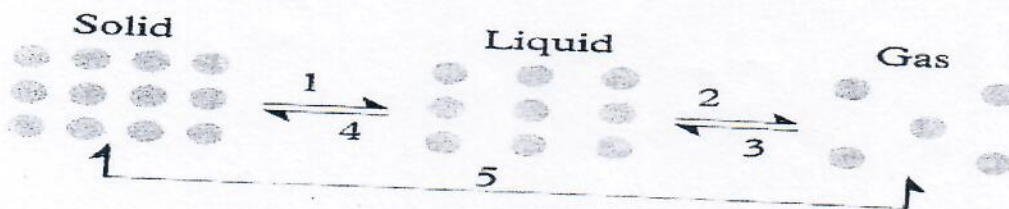2- The diagram below shows the waves produced by a source in **two seconds**.

   The frequency of the waves is:
   a) 0.5 hertz   c) 4 hertz

   b) 2 hertz   d) 1 hertz

3- Which of the following energy sources is **non-Renewable** energy?

   a) Solar energy   c) Natural gas

   b) Wind energy   d) Geothermal energy

4- The process represented by the arrow '**1**' is:

   a) Melting   c) Condensation

   b) Boiling   d) Freezing

5- Radon $^{220}_{86}Rn$ decays by emitting an alpha particle to form an element whose symbol is:

a) $^{216}_{85}At$

c) $^{218}_{84}Po$

b) $^{216}_{84}Po$

d) $^{216}_{86}Rn$

6- The truth table below shows:

a) OR-gate   b) NOT-gate   c)AND-gate   d)NOR-gate

Input (A)	Input (B)	Output
0	0	0
1	0	0
0	1	0
1	1	1

7- The attraction force required to keep planet in orbit around the sun is:
a) Contact force   c) Magnetic force

b) Gravitational force   d) Frictional force

8- DC motors are used to convert electrical energy to:
a) Thermal energy   c) Heat energy

b) Magnetic energy   d) Mechanical energy

9- Which of the following circuits correctly illustrates the arrangement of an ammeter and a voltmeter in a circuit designed to measure current and voltage in a lamp?
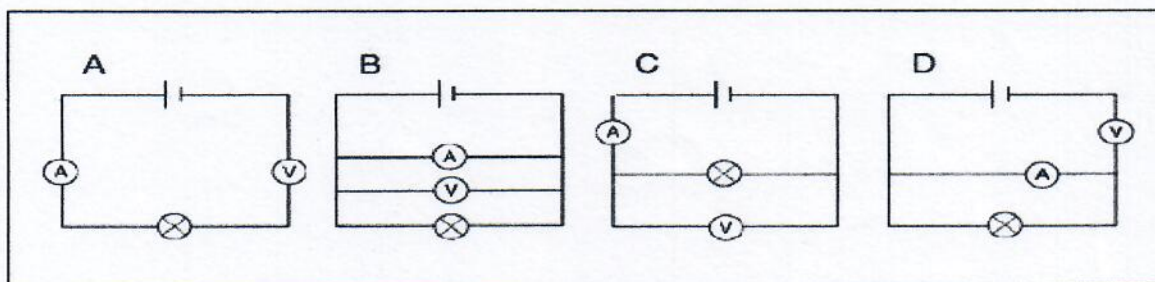
10- Ice floats on a cold water because
a) Cold water has less density than ice
b) Cold water is more dense than ice
c) Cold water has same density like ice
d) Ice is heavier than water

3

PART TWO: STRUCTURED QUESTIONS   **(90 MARKS)**

ANSWER ALL THE FOLLOWING QUESTIONS IN THE SPACE PROVIDED

QUESTION ONE: MEASUREMENT AND SOLAR SYSTEM

Complete the table with the only three correct words in the box that matches.

Capacitance	Seasons	Day/night	Newton

Revolution of the earth causes _____1 mark

Farad is measured for _____1 mark

Kg m/s^2 is equal to _____1 mark

QUESTION TWO: WAVES

The diagram below shows wave propagation
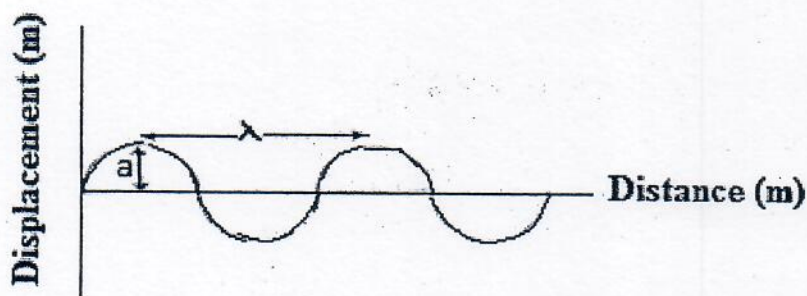
a) Write what each letter stands for
   i) λ _____ 1 mark
   ii)   a _____ 1 mark
b) State the number of complete waves shown on the diagram (wavelength)
   _____ 1 mark
c) How many crests are there in the diagram
   _____ 1mark
d) How many troughs are there in the diagram
   _____ 1mark

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e) The speed of an electromagnetic wave is 3×10^8 m/s if its frequency is 6×10^7 HZ, Find its wavelength?

_____

_____

_____ 3 marks

f) State the laws of reflection of light

I) _____

_____ 1 mark

II) _____

_____ 2marks

g) The figure below shows a ray of light incident on a plane mirror. Complete the diagram to show reflected ray and angle of reflection.   (1 mark)
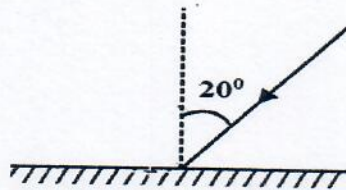
h) State two properties of an image formed by a plane mirror

I) _____ 1 mark

II) _____ 1mark

i) The diagram in the figure below shows the effects of short and long sight and how they can be corrected using lenses.

Short sight   and its corretion   long sight   and its correction

light from a
distant object

light from a
near object
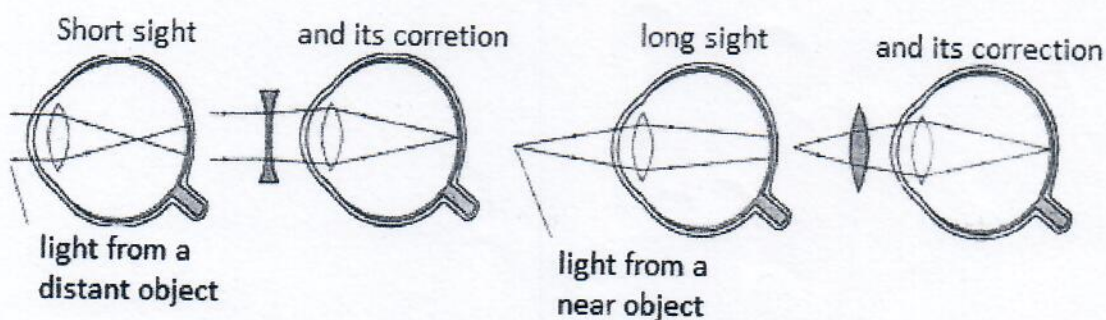
I)   What type of lens is used to correct for long sight?

_____ 1 mark

II)   What type of lens is used to correct for short sight?

_____ 1 mark

5
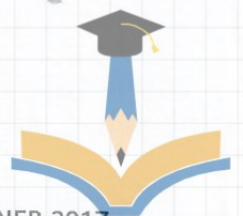
QUESTION THREE: WORK, POWER AND ENERGY

A cat of 500N runs up a flight of stairs 6 m high. It takes 10 seconds to reach the top of the stairs.

a) Calculate the work done by the Cat?

_____
_____2 marks

b) Calculate the power of the Cat?

_____
_____ 2 marks

c) A pendulum is swinging as shown in the figure below. Kinetic and potential energies are transformed.
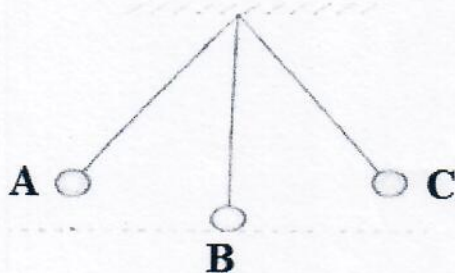
What are the energy transformations that take place between the points A, B and C.

I)   From A to B _____ 1 mark

II)   From B to C _____ 1 mark

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QUESTION FOUR: HEAT

A copper block of mass 5 kg and specific heat capacity of 390 $jkg^{-1}{}^0C^{-1}$ is heated from 20^0C to 100^0C.

a) Calculate the heat energy required?

_____

_____

_____3 marks

b) The specific heat capacity of water is 4200 $jkg^{-1}{}^0C^{-1}$ and that of copper is 390 $jkg^{-1}{}^0C^1$. If they are heated with the same quantity, which heats up first and why?

_____

_____3 marks

QUESTION FIVE: FORCES AND MOTION

A) Give one example of contact force and one example of non-contact force

   I.   _____ 1 mark

   II. _____ 1 mark

B) Fill in the spaces below using the following words in the box:

Push	pull	Newton

force is _____ or _____ and unit of force is_____ **3 marks**

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C) The graph represents the velocity –time graph of a Mark 2 Toyota.
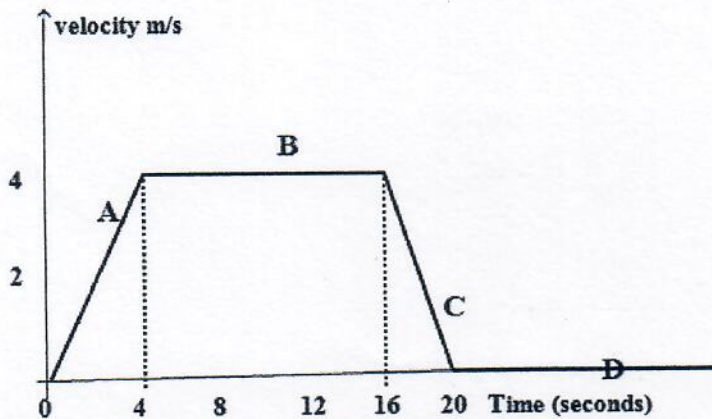
Choose the correct words from the box to complete the sentences below:

2m/s , retardation, 4m/s , acceleration, 0m/s, velocity, 1m/s², scalar, 2 m/s², vector, 12s, 16s

i.   The part of graph A represents an _____of 1m/s²   1 mark

ii.   The part of graph B represents a velocity of _____1 mark

iii.   The part of graph C represents a _____of _____ 2 marks

iv.   The time taken when the Mark 2 at a constant speed is_____ sec 1mark

v.   The part of graph D represents _____   1 mark

vi.   Velocity is a _____ and speed is a _____   2 marks

vii.   What is the total distance of whole journey?

_____

_____

_____5 marks

viii. What is average speed for the whole journey?

_____

_____3 marks

8

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QUESTION SIX: ELECTRICITY AND ELECTRONICS

A. Two resistors of 4Ω and 12 Ω are connected in parallel with 24 V battery as shown in the diagram below
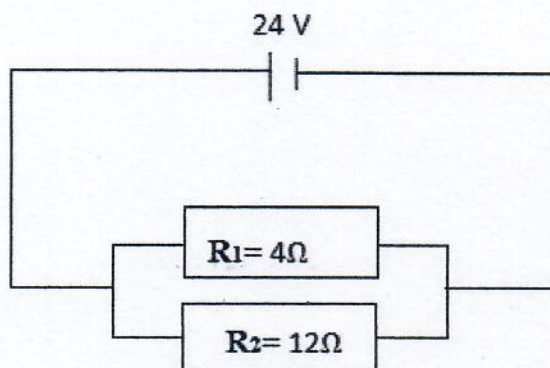
Calculate:

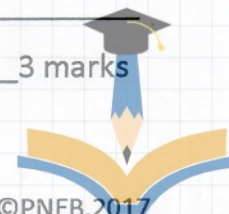**i.** The total resistance in the circuit

_____

_____

_____3 marks

ii. The total current in the circuit

_____

_____

_____3 marks

iii. The voltage across the 4 Ω resistor

_____

_____

_____

_____3 marks

iv. The voltage across the 12 Ω resistor

_____

_____

_____

_____ 3 marks

B. Define the following words

i) Current_____ 1 mark

ii) Static electricity_____ 1 mark

C. Calculate the cost of using 300 W lamp of a house for 5 hours if the cost per unit is £2?
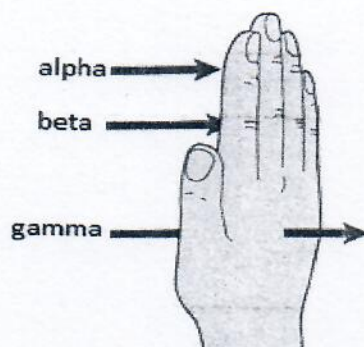
_____

_____

_____ 2 marks

QUESTION SEVEN: RADIOACTIVITY

A) Name three radiations emitted by radioactive materials
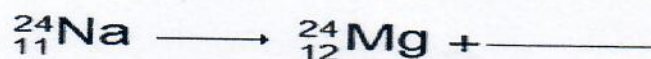
I) _____ 1 mark

II) _____ 1 mark

III) _____ 1 mark

B) The figure below shows the penetrating power of radiation through the human body.

    i) Which radiation has the most penetrating power

_____ 1 mark

    ii) Which radiation has the lowest speed

_____ 1 mark

    iii) Which radiation has the highest speed_____ 1 mark

    iv) Which radiation is the most massive_____ 1 mark

C) When radioactive sodium-24 decays, magnesium-24 is formed. The following equation represents part of the decay process.
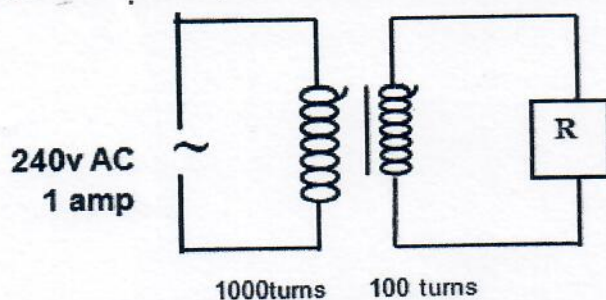
$$^{24}_{11}Na \longrightarrow \ ^{24}_{12}Mg \ + \underline{\hspace{3cm}}$$

Assuming that only one charged particle is emitted:

    i. What is the mass number of this particle?

_____ 1 mark

    ii. What is the relative charge of this particle?

_____ 1 mark

    iii. What type of particle is it?

_____ 1 mark

QUESTION EIGHT: ELECTROMAGNETIC INDUCTION AND MAGNETISM

A) The circuit below represents a transformer and a resistance R

240v AC
1 amp

1000turns   100 turns

i.   Which type of transformer is it? _____ 1 mark

ii.   Calculate the current flowing through **R**

_____

_____

_____

_____2 marks

iii. Calculate the (p.d) voltage flowing through **R**

_____

_____

_____

_____

_____ 2 marks

iv.   Find the resistance of **R**

_____

_____

_____

_____2 marks

B) The diagrams below shows the magnetic field pattern between the magnets
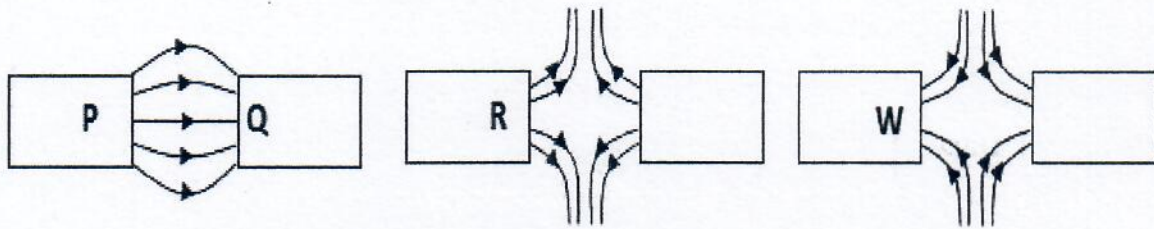
Identify the poles **P** and **Q**

    i. _____1 mark

    ii. _____1 mark

Identify the poles **R** and **W**

    iii. _____1 mark

    iv. _____1 mark

C) State the law of magnetism

_____1 mark

End.

Use this page for rough work, it will not be marked.